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METEOROLOGICAL DATA REPORT

AEROBEE NASA 4.165 UA
(21 April 1966)

BY

MARJORIE Mc LARDIE HOIDALE

FACILITY FORM 602

<u>N66 30205</u> (ACCESSION NUMBER)	<u>1</u> (THRU)
<u>35</u> (PAGES)	<u>1</u> (CODE)
<u>CR-76054</u> (NASA CR OR TMX OR AD NUMBER)	<u>20</u> (CATEGORY)

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DA Task IV650212A127-02

ATMOSPHERIC SCIENCES LABORATORY
WHITE SANDS MISSILE RANGE, NEW MEXICO

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ABSTRACT

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Meteorological data gathered for the launching of Aerobee NASA 4.165 UA are presented for the National Aeronautics and Space Administration, the Johns Hopkins University and for ballistic studies. The data appear, along with calculated ballistic data, in tabular form.

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INTRODUCTION

Aerobee NASA 4.165 UA was launched by Naval Ordnance Missile Test Facility personnel, White Sands Missile Range (WSMR), New Mexico, at 0425 hours MST, 21 April 1966.

Meteorological data used in conjunction with theoretical calculations to predict rocket impact were collected by the Meteorological Support Division, Atmospheric Sciences Laboratory, White Sands Missile Range, New Mexico. The Ballistic Meteorologists for this firing were Marjorie M. Hoidale and Gordon L. Dunaway.

DISCUSSION

Wind data for the first 4,000 feet above the surface were obtained from a Double-Theodolite Wind Velocity Computer System (1). Balloons released at the launch site were observed and tracked from a 2,000-foot baseline. Continuous angular data were transmitted from two electrically instrumented theodolites to a computer where the data were reduced to obtain a velocity-vs-height relationship. The computer output drives two recorders which trace north-south and east-west components on a specially designed wind velocity computer ballistic chart. It is possible to read directly from the chart both the mean wind component values and the mean ballistic wind components in the various ballistic layers.

Temperature, pressure and humidity data, along with upper wind data from 4,000 to approximately 100,000 feet above the surface, were obtained from standard rawinsonde operations.

Mean wind component values in each ballistic zone were determined from vertical cross sections by equal-area method.

Data appearing in Tables IX, X and XI, are based on the L. D. Duncan (2) theory. The "Predicted Impact" includes, when applicable, an adjustment of impact based on the experience of the Ballistic Meteorologists and the forecast of firing time wind conditions.

REFERENCES

1. "Double-Theodolite Wind Velocity Computer," UNCLASSIFIED, U. S. Army Signal Research and Development Laboratory, Fort Monmouth, New Jersey, July 1959.
2. Duncan, L. D. and R. J. Ensey, November 1964: "Six Degree of Freedom Digital Simulation Model for Unguided Fin-Stabilized Rockets." ERDA-196, Environmental Sciences Directorate, United States Army Electronics Research and Development Activity, White Sands Missile Range, New Mexico.

PAYLOAD	Includes Nosecone Weight	344.5	Pounds
* UNIT WIND EFFECT	Cross	3.11	Miles/MPH
	Range	3.66	Miles/MPH
TOWER TILT EFFECT		16.50	Miles/Degree
BURNOUT	Velocity	5,140	Feet/Second
	Altitude	117,955	Feet MSL
	Time	51.8	Seconds
PEAK	Altitude	100.1	Miles MSL
	Time	212.0	Seconds
TOTAL FLIGHT TIME		410.0	Seconds
CORIOLIS EFFECT	West	4.30	Miles

TABLE I. THEORETICAL ROCKET PERFORMANCE VALUES
AEROBEE NASA 4.165 UA

* An empirical correction (85 percent of the total) has been made to the cross-unit wind effect. This correction was determined from statistical studies.

LAYERS IN FEET ABOVE GROUND	BALLISTIC FACTOR
143- 250	.185
250- 400	.115
400- 600	.100
600- 800	.062
800-1200	.053
1200-1600	.031
1600-2000	.025
2000-2500	.029
2500-3000	.023

LAYERS IN FEET ABOVE GROUND	BALLISTIC FACTOR
3000- 3500	.019
3500- 4000	.016
4000- 5000	.031
5000-10000	.096
10000-15000	.056
15000-20000	.033
20000-25000	.023
25000-30000	.017
30000-35000	.014

LAYERS IN FEET ABOVE GROUND	BALLISTIC FACTOR
35000- 40000	.009
40000- 45000	.006
45000- 50000	.012
50000- 60000	.010
60000- 70000	.009
70000- 80000	.007
80000- 90000	.008
90000-100000	.010

TABLE II. BALLISTIC FACTORS
AEROBEE NASA 4.165 UA

TIME IN MINUTES	ANEMOMETER-MEASURED WIND	
	Speed (Knots)	Direction (Degrees)
T - 15	7.0	066
T - 10	6.5	054
T - 5	6.5	038
T - Time	6.0	067
T + 5	6.0	081
T + 10	7.0	085
T + 15	7.5	090

TABLE III. ANEMOMETER-MEASURED WIND SPEED AND DIRECTION
AEROBEE NASA 4.165 UA

NOTE: Wind speeds and directions are 5-minute averages
centered at indicated times.

LAYERS IN FEET ABOVE GROUND	MEAN WIND COMPONENTS IN MILES PER HOUR													
	1		2		3		4		5		6		7	
	0045 MST		0116 MST		0140 MST		0215 MST		0230 MST		0250 MST		0325 MST	
	N-S	E-W	N-S	E-W	N-S	E-W	N-S	E-W	N-S	E-W	N-S	E-W	N-S	E-W
143- 250	1.0S	0.5E	0.0	0.5E	0.5N	0.0	0.5N	1.0E	0.5S	3.0E	2.0S	7.0E	2.0S	10.0E
250- 400	2.0	1.5	0.0	0.5	0.5S	2.5E	0.5S	1.0	3.0	6.0	2.0	10.0	1.0	13.0
400- 600	2.0	3.5	0.0	0.5	0.0	3.0	4.5	4.0	6.5	10.5	1.0	15.0	1.0	16.5
600- 800	2.0	4.5	0.5S	0.0	0.0	2.5	6.5	10.0	8.0	14.0	4.5	17.0	4.0	18.5
800-1200	2.0	5.0	0.5	1.5E	2.0S	2.5	6.5	8.0	8.0	14.0	2.5	16.0	3.0	14.5
1200-1600	5.0	7.5	5.0	7.5	4.5	7.5	7.0	7.0	10.0	17.0	3.5	10.0	13.0	15.0
1600-2000	9.5	12.0	3.0	12.0	3.5	9.0	11.0	14.0	10.0	15.5	10.5	17.0	26.0	28.5
2000-2500	12.0	16.0	10.0	14.5	12.0	13.5	11.5	17.0	10.0	14.0	12.0	13.0	25.0	19.0
2500-3000	15.5	15.5	18.0	20.5	14.5	18.0	12.0	18.0	17.0	17.0	17.5	30.5	21.0	14.0
3000-3500	15.0	11.0	13.5	18.0	15.5	21.0	15.5	20.0	16.0	25.0	15.0	9.5	15.0	9.5
3500-4000	9.5	3.0	18.5	19.0	12.0	15.5	16.5	20.0	15.0	18.0	13.5	9.5	15.0	12.5

TABLE IV. PILOT-BALLOON-MEASURED WIND DATA (DOUBLE THEODOLITE METHOD)
AEROBEE NASA 4.165 UA

LAYERS IN FEET ABOVE GROUND	MEAN WIND COMPONENTS IN MILES PER HOUR											
	8		9		10		11		12		13	
	0340 MST		0353 MST		0403 MST		0411 MST		0417 MST		0426 MST	
	N-S	E-W	N-S	E-W	N-S	E-W	N-S	E-W	N-S	E-W	N-S	E-W
143- 250	2.0S	8.5E	2.0S	10.0E	2.0S	7.5E	4.0N	6.0E	4.0N	6.0E	1.0S	4.5E
250- 400	0.5	11.5	1.5	12.5	2.0	11.5	3.5	7.5	0.0	6.0	2.5	8.0
400- 600	4.0	14.5	0.0	13.0	5.0	15.0	2.0S	11.5	3.0S	10.0	7.0	12.0
600- 800	7.0	14.5	4.0S	12.0	7.5	16.0	8.5	14.5	9.0	14.0	13.0	14.5
800-1200	11.0	17.0	10.0	16.0	8.5	18.0	12.5	19.0	14.0	15.0	18.0	17.0
1200-1600	16.0	18.0	10.0	16.0	18.0	24.5	16.0	11.5	12.0	8.0	19.0	18.5
1600-2000	24.0	21.0	19.0	20.0	15.5	14.5	15.0	5.0	11.0	5.0	22.5	14.0
2000-2500	21.0	18.0	18.5	10.0	14.0	5.0	8.0	2.5	8.0	5.0	14.5	8.0
2500-3000	13.0	4.0	8.0	2.0	7.5	1.0	8.0	3.0	13.0	8.0	16.5	10.0
3000-3500	11.0	7.0	12.0	8.5	7.5	2.0	16.5	5.0	15.0	8.0	16.5	14.5
3500-4000	18.0	17.0	12.5	8.5	18.0	13.0	17.0	4.0	17.0	8.0	10.0	7.5

TABLE IV. PILOT-BALLOON-MEASURED WIND DATA - DOUBLE THEODOLITE METHOD (Cont)
AEROBEE NASA 4.165 UA

LAYERS IN FEET ABOVE GROUND	MEAN WIND COMPONENTS IN KNOTS	
	1	
	0335 MST	
	N-S	E-W
4000- 5000	7.5S	6.5E
5000-10000	19.0	0.0
10000-15000	29.5	17.0W
15000-20000	23.0	27.5

TABLE V. UPPER AIR DATA
(4,000-20,000 FT)
AEROBEE NASA 4.165 UA

8

LAYERS IN FEET ABOVE GROUND	MEAN WIND COMPONENTS IN KNOTS					
	1		2*		3	
	2300 MST		0110 MST		0425 MST	
	N-S	E-W	N-S	E-W	N-S	E-W
4000- 5000	11.0S	2.0E	11.0S	2.0E	10.0S	8.5E
5000- 10000	12.0	14.5W	16.5	9.5W	22.0	0.0
10000- 15000	20.5	17.5	27.0	15.5	23.0	27.5W
15000- 20000	14.5	17.5	21.0	25.0	30.5	25.5
20000- 25000	17.0	29.5	18.5	32.0	27.5	33.0
25000- 30000	22.0	26.0	20.5	35.5	27.5	33.0
30000- 35000	22.0	26.0	23.0	40.0	23.5	40.5
35000- 40000	20.0	34.5	15.5	42.5	15.5	43.0
40000- 45000	14.0	38.5	14.0	38.5	15.5	42.5
45000- 50000	12.0	34.0	17.0	29.5	17.5	30.5
50000- 60000	13.5	36.5	12.5	35.0	12.5	35.0
60000- 70000	8.5	23.0	8.0	22.5	17.0	29.5
70000- 80000	8.5	5.0	3.0	8.5	5.5	15.0
80000- 90000	2.0	11.0	6.0N	7.0	2.0N	11.0
90000-100000	0.0	5.0	2.0	6.0	10.0	1.5

TABLE VI. UPPER AIR DATA (4,000-100,000 FT)
AEROBEE NASA 4.165 UA

* Rawin, telecompute data not available.

UPPER AIR DATA
3911009
WHITE SANDS SITE
TABLE VII

WSTM SITE COORDINATES
E 488,580 FEET
N 185,045 FEET

STATION ALTITUDE 3989.0 FEET MSL
20 APR. 66 2300 HRS MST
ASCENSION NO. 262

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE		RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND KNOTS		WIND DATA DIRECTION DEGREES(TN)	SPEED KNOTS	INDEX OF REFRACTION
		AIR DEGREES	DEWPOINT CENTIGRADE							
3989.0	880.0	11.5	-4.2	33.0	1075.1	657.6	0.5	0.0	0.0	1.000260
4000.0	879.6	11.6	-4.3	32.6	1074.3	657.7	0.5	0.0	0.0	1.000260
4500.0	863.8	14.3	-7.9	20.8	1045.5	660.6	22.6	22.6	1.0	1.000248
5000.0	848.2	13.3	-9.2	20.0	1030.2	659.5	44.7	44.7	1.9	1.000244
5500.0	832.9	12.4	-10.4	19.3	1015.1	658.4	66.8	66.8	2.9	1.000239
6000.0	817.9	11.4	-11.7	18.5	1000.2	657.3	88.9	88.9	3.9	1.000234
6500.0	803.1	10.5	-13.0	17.8	985.5	656.1	111.0	111.0	4.8	1.000230
7000.0	788.7	9.5	-14.3	17.0	971.1	655.0	133.1	133.1	5.8	1.000226
7500.0	774.0	8.6	-14.8	17.4	956.3	653.9	147.2	147.2	6.0	1.000222
8000.0	759.7	7.7	-15.3	17.8	941.7	652.8	161.7	161.7	6.4	1.000219
8500.0	745.6	6.7	-15.8	18.3	927.3	651.7	180.4	180.4	7.3	1.000215
9000.0	731.7	5.8	-16.3	18.7	913.2	650.6	198.9	198.9	8.7	1.000212
9500.0	718.1	4.8	-16.8	19.1	899.3	649.5	217.3	217.3	10.5	1.000208
10000.0	704.8	3.9	-17.3	19.6	885.6	648.4	227.2	227.2	13.0	1.000205
10500.0	691.7	3.0	-17.9	20.0	872.1	647.3	234.1	234.1	15.7	1.000202
11000.0	678.9	2.0	-18.4	20.4	858.9	646.2	233.7	233.7	17.9	1.000199
11500.0	666.3	1.1	-18.9	20.9	845.9	645.1	231.1	231.1	20.1	1.000195
12000.0	653.9	0.2	-19.5	21.3	833.0	644.0	224.8	224.8	22.3	1.000192
12500.0	641.8	-0.8	-20.1	21.7	820.4	642.8	220.4	220.4	24.2	1.000189
13000.0	629.7	-1.9	-20.3	23.2	808.4	641.5	216.8	216.8	26.0	1.000186
13500.0	617.7	-3.5	-20.0	26.7	797.3	639.7	215.3	215.3	26.9	1.000184
14000.0	605.8	-5.0	-19.9	30.2	786.5	637.9	214.0	214.0	27.8	1.000182
14500.0	594.2	-6.5	-20.0	33.6	775.8	636.1	213.1	213.1	28.4	1.000180
15000.0	582.8	-8.0	-20.2	37.1	765.3	634.3	212.8	212.8	28.9	1.000177
15500.0	571.5	-9.5	-20.0	42.4	754.5	632.6	213.3	213.3	29.5	1.000175
16000.0	560.2	-10.9	-19.8	48.3	743.6	630.9	214.5	214.5	29.7	1.000173
16500.0	549.3	-12.3	-19.8	54.2	733.0	629.1	216.3	216.3	29.5	1.000170
17000.0	538.5	-13.7	-19.9	60.1	722.6	627.4	218.6	218.6	28.9	1.000168
17500.0	527.8	-15.1	-22.7	52.7	712.0	625.8	221.3	221.3	28.1	1.000164
18000.0	517.2	-16.4	-24.7	49.1	701.5	624.1	223.4	223.4	27.1	1.000161

STATION ALTITUDE 3989.0 FEET MSL
20 APR. 66 2300 HRS MST
ASCENSION NO. 262

UPPER AIR DATA
3911009
WHITE SANDS SITE
TABLE VII (Cont)

WSTM SITE COORDINATES
E 488,580 FEET
N 185,045 FEET

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	AIR TEMPERATURE DEGREES CENTIGRADE	TEMPERATURE DEWPOINT CENTIGRADE	RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND KNOTS	WIND DATA DIRECTION DEGREES(TN)	SPEED KNOTS	INDEX OF REFRACTION
18500.0	506.7	-17.9	-26.0	49.3	691.2	622.3	224.8	26.1	1.000158
19000.0	496.5	-19.3	-27.3	49.5	681.1	620.6	224.9	25.1	1.000156
19500.0	486.5	-20.7	-28.6	49.7	671.1	618.8	224.3	24.1	1.000153
20000.0	476.6	-22.1	-29.9	49.9	661.3	617.1	224.5	23.7	1.000150
20500.0	466.9	-23.6	-28.9	62.0	651.4	615.3	225.1	23.3	1.000149
21000.0	457.2	-25.0	-27.8	78.4	641.7	613.5	229.5	22.3	1.000147
21500.0	447.8	-25.9	-28.1	83.5	630.8	612.4	233.8	21.7	1.000144
22000.0	438.4	-26.6	-28.8	82.8	615.3	611.5	237.5	21.9	1.000141
22500.0	429.3	-27.3	-29.6	82.1	608.1	610.7	240.7	22.8	1.000139
23000.0	420.3	-28.2	-30.2	84.3	597.5	609.6	243.4	24.3	1.000136
23500.0	411.4	-29.1	-30.7	87.1	587.1	608.4	243.4	26.4	1.000134
24000.0	402.8	-30.0	-31.3	89.8	576.9	607.3	242.5	28.7	1.000131
24500.0	394.3	-30.9	-31.9	92.6	566.9	606.1	242.7	30.7	1.000129
25000.0	385.8	-32.1	-32.9	93.4	557.4	604.7	243.0	32.6	1.000127
25500.0	377.4	-33.4	-34.4	92.1	548.3	603.0	243.0	32.9	1.000124
26000.0	369.2	-34.7	-35.9	90.8	539.4	601.3	242.9	33.2	1.000122
26500.0	361.1	-36.1	-37.4	89.6	530.6	599.6	242.5	33.6	1.000120
27000.0	353.2	-37.4	-38.9	88.3	522.0	597.9	241.6	33.9	1.000118
27500.0	345.5	-38.8	-40.3	87.0	513.5	596.2	240.1	34.1	1.000116
28000.0	337.9	-40.1	-41.8	85.8	505.2	594.4	238.9	34.1	1.000114
28500.0	330.6	-41.5	-43.3	84.5	497.1	592.7	238.1	33.9	1.000112
29000.0	323.3	-42.8	-44.7	83.2	489.1	591.0	236.2	34.3	1.000110
29500.0	316.3	-44.2	-46.2	82.0	481.2	589.2	233.9	35.0	1.000108
30000.0	309.3	-45.5	-47.7	80.4	473.3	587.6	233.8	34.3	1.000106
30500.0	302.3	-46.5	-49.0	77.7	464.7	586.2	234.0	33.6	1.000104
31000.0	295.4	-47.7	-50.6	73.8**	456.4	584.7	233.8	35.3	1.000102
31500.0	288.4	-49.0	-52.5	67.8**	448.2	583.0	234.5	35.8	1.000100
32000.0	281.6	-50.2	-54.5	61.9**	440.2	581.4	236.2	35.0	1.000098
32500.0	275.0	-51.5	-56.6	55.9**	432.3	579.7	236.4	35.6	1.000096
33000.0	268.6	-52.8	-58.7	49.9**	424.6	578.0	236.2	36.4	1.000095

** AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

UPPER AIR DATA
3911009
WHITE SANDS SITE
TABLE VII (Cont)

WSTM SITE COORDINATES
E 488,580 FEET
N 185,045 FEET

STATION ALTITUDE 3989.0 FEET MSL
20 APR. 66 2300 HRS MST
ASCENSION NO. 262

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE AIR DEGREES	TEMPERATURE DEWPOINT CENTIGRADE	RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND KNOTS	WIND DATA		INDEX OF REFRACTION
							DIRECTION DEGREES(TN)	SPEED KNOTS	
33500.0	262.2	-54.1	-60.9	44.0**	417.0	576.3	235.9	35.6	1.000093
34000.0	256.1	-55.3	-63.1	38.0**	409.6	574.7	235.5	34.9	1.000091
34500.0	250.0	-56.6	-65.6	32.1**	402.3	573.0	234.6	34.5	1.000090
35000.0	244.2	-57.9	-68.2	26.1**	395.2	571.3	233.6	34.0	1.000088
35500.0	238.4	-59.2	-71.1	20.1**	388.2	569.6	232.5	33.1	1.000086
36000.0	232.8	-60.5	-74.6	14.2**	381.4	567.9	231.3	32.6	1.000085
36500.0	227.3	-61.7	-79.1	8.2**	374.6	566.2	229.9	32.3	1.000083
37000.0	222.0	-63.0	-87.6	2.2**	368.1	564.4	230.5	33.4	1.000082
37500.0	216.7	-63.2	0.	-0. **	359.6	564.2	231.6	34.8	1.000080
38000.0	211.5	-62.7	0.	-0. **	350.1	564.9	233.5	36.8	1.000078
38500.0	206.4	-62.2	0.	-0. **	340.8	565.6	235.6	38.3	1.000076
39000.0	201.4	-61.7	0.	-0. **	331.9	566.2	238.0	38.5	1.000074
39500.0	196.6	-61.2	0.	-0. **	323.1	566.9	239.8	38.7	1.000072
40000.0	191.8	-60.7	0.	-0. **	314.6	567.6	240.6	38.9	1.000070
40500.0	187.2	-60.2	0.	-0. **	306.3	568.2	241.5	39.2	1.000068
41000.0	182.7	-59.7	0.	-0. **	298.2	568.9	242.4	39.5	1.000066
41500.0	178.3	-59.2	0.	-0. **	290.4	569.6	241.9	40.1	1.000065
42000.0	174.0	-58.7	0.	-0. **	282.7	570.2	241.2	40.6	1.000063
42500.0	169.8	-58.2	0.	-0. **	275.3	570.9	242.1	41.2	1.000061
43000.0	165.8	-57.7	0.	-0. **	268.1	571.5	242.5	41.9	1.000060
43500.0	161.8	-57.2	0.	-0. **	261.0	572.2	242.2	42.9	1.000058
44000.0	157.9	-57.2	0.	-0. **	254.8	572.2	243.7	42.6	1.000057
44500.0	154.2	-57.3	0.	-0. **	248.8	572.1	246.1	41.5	1.000055
45000.0	150.5	-57.4	0.	-0. **	243.0	571.9	247.7	40.5	1.000054
45500.0	146.9	-57.5	0.	-0. **	237.4	571.8	249.2	39.4	1.000053
46000.0	143.4	-57.6	0.	-0. **	231.8	571.6	250.4	38.0	1.000052
46500.0	140.0	-57.7	0.	-0. **	226.4	571.5	250.8	37.8	1.000050
47000.0	136.7	-57.9	0.	-0. **	221.2	571.3	250.0	39.3	1.000049
47500.0	133.4	-58.0	0.	-0. **	216.0	571.2	248.7	40.1	1.000048
48000.0	130.2	-58.1	0.	-0. **	211.0	571.0	246.7	39.5	1.000047

F

** AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

STATION ALTITUDE 5900.0 FEET MSL
20 APR. 66 2000 HRS PST
ASCENSION NO. 262

UPPER AIR DATA
3911009
WHITE SANDS SITE
TABLE VII (Cont)

WSTM SITE COORDINATES
E 488,580 FEET
N 185,045 FEET

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE AIR DEGREES	TEMPERATURE DEWPOINT CENTIGRADE	RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND KNOTS	WIND DATA		INDEX OF REFRACTION
							DIRECTION DEGREES(TN)	SPEED KNOTS	
48500.0	127.1	-58.2	0.	**	206.1	570.9	244.7	38.8	1.000046
49000.0	124.1	-58.5	0.	**	201.3	570.7	243.5	38.0	1.000045
49500.0	121.1	-58.4	0.	**	196.6	570.6	242.3	37.2	1.000044
50000.0	118.3	-58.5	0.	**	192.0	570.4	242.5	36.0	1.000043
50500.0	115.4	-58.6	0.	**	187.5	570.3	243.1	34.8	1.000042
51000.0	112.7	-58.7	0.	**	183.1	570.1	244.2	34.4	1.000041
51500.0	110.0	-58.9	0.	**	178.9	570.0	245.7	34.5	1.000040
52000.0	107.4	-59.0	0.	**	174.7	569.9	246.7	34.3	1.000039
52500.0	104.8	-59.1	0.	**	170.6	569.7	247.0	33.9	1.000038
53000.0	102.3	-59.2	0.	**	166.7	569.6	245.6	33.5	1.000037
53500.0	99.9	-59.3	0.	**	162.7	569.5	242.6	33.3	1.000036
54000.0	97.5	-58.2	0.	**	158.1	570.9	241.2	33.1	1.000035
54500.0	95.2	-57.7	0.	**	153.9	571.6	240.6	33.1	1.000034
55000.0	92.9	-58.1	0.	**	150.6	571.0	241.9	34.7	1.000034
55500.0	90.7	-58.5	0.	**	147.3	570.4	243.9	36.9	1.000033
56000.0	88.5	-59.0	0.	**	144.0	569.8	247.2	38.7	1.000032
56500.0	86.4	-59.4	0.	**	140.9	569.2	251.2	40.3	1.000031
57000.0	84.4	-59.9	0.	**	137.8	568.6	254.1	41.0	1.000031
57500.0	82.3	-60.3	0.	**	134.8	568.0	256.5	41.2	1.000030
58000.0	80.4	-60.8	0.	**	131.9	567.4	256.8	40.8	1.000029
58500.0	78.4	-61.1	0.	**	128.9	567.1	256.1	40.2	1.000029
59000.0	76.6	-60.9	0.	**	125.7	567.3	253.8	38.6	1.000028
59500.0	74.7	-60.8	0.	**	122.6	567.5	250.9	36.7	1.000027
60000.0	72.9	-60.0	0.	**	119.6	567.7	248.9	37.4	1.000027
60500.0	71.2	-60.5	0.	**	116.6	567.9	247.1	38.9	1.000026
61000.0	69.5	-60.3	0.	**	113.8	568.1	248.8	37.9	1.000025
61500.0	67.8	-60.2	0.	**	111.0	568.3	251.1	36.5	1.000025
62000.0	66.2	-60.0	0.	**	108.2	568.5	251.5	36.6	1.000024
62500.0	64.6	-59.9	0.	**	105.6	568.7	251.6	36.8	1.000023
63000.0	63.1	-59.7	0.	**	103.0	568.9	251.6	35.7	1.000023

** AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

STATION ALTITUDE 3989.0 FEET MSL
20 APR. 66 2300 HRS MST
ASCENSION NO. 262

UPPER AIR DATA
3911009
WHITE SANDS SITE
TABLE VII (Cont)

WSTM SITE COORDINATES
E 488,580 FEET
N 185,045 FEET

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	AIR TEMPERATURE DEGREES CENTIGRADE	TEMPERATURE DEWPOINT CENTIGRADE	RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND KNOTS	WIND DATA DIRECTION DEGREES(TN)	SPEED KNOTS	INDEX OF REFRACTION
63500.0	61.6	-59.5	0.	-0.	100.4	569.1	251.5	34.2	1.000022
64000.0	60.1	-59.4	0.	-0.	98.0	569.3	250.4	33.6	1.000022
64500.0	58.7	-59.2	0.	-0.	95.6	569.5	248.9	33.4	1.000021
65000.0	57.3	-59.1	0.	-0.	93.2	569.7	248.4	33.1	1.000021
65500.0	55.9	-58.9	0.	-0.	90.9	569.9	248.7	32.6	1.000020
66000.0	54.6	-58.8	0.	-0.	88.7	570.1	249.0	32.0	1.000020
66500.0	53.2	-58.6	0.	-0.	86.5	570.3	249.4	31.3	1.000019
67000.0	52.0	-58.5	0.	-0.	84.4	570.5	249.6	29.8	1.000019
67500.0	50.7	-58.3	0.	-0.	82.3	570.7	249.4	27.2	1.000018
68000.0	49.5	-58.2	0.	-0.	80.3	570.9	252.3	26.1	1.000018
68500.0	48.3	-58.0	0.	-0.	78.3	571.1	257.1	25.8	1.000017
69000.0	47.2	-57.3	0.	-0.	76.2	572.0	261.2	24.2	1.000017
69500.0	46.1	-56.4	0.	-0.	74.1	573.3	265.1	22.2	1.000016
70000.0	45.0	-55.5	0.	-0.	72.1	574.5	268.3	22.6	1.000016
70500.0	44.0	-54.5	0.	-0.	70.1	575.7	271.3	23.1	1.000016
71000.0	42.9	-53.6	0.	-0.	68.1	576.9	271.7	19.4	1.000015
71500.0	41.9	-52.7	0.	-0.	66.3	578.2	271.4	15.9	1.000015
72000.0	41.0	-51.7	0.	-0.	64.5	579.4	266.8	13.9	1.000014
72500.0	40.0	-50.8	0.	-0.	62.7	580.6	260.2	12.2	1.000014
73000.0	39.1	-51.6	0.	-0.	61.5	579.5	247.9	11.5	1.000014
73500.0	38.2	-52.5	0.	-0.	60.3	578.4	235.7	11.3	1.000013
74000.0	37.3	-53.3	0.	-0.	59.1	577.3	223.9	11.9	1.000013
74500.0	36.4	-54.2	0.	-0.	57.9	576.2	217.2	13.0	1.000013
75000.0	35.6	-55.0	0.	-0.	56.8	575.1	220.4	15.3	1.000013
75500.0	34.7	-55.5	0.	-0.	55.6	574.5	222.9	17.4	1.000012
76000.0	33.9	-55.1	0.	-0.	54.2	575.0	214.9	16.5	1.000012
76500.0	33.2	-54.7	0.	-0.	52.9	575.5	207.0	15.5	1.000012
77000.0	32.4	-54.4	0.	-0.	51.6	575.9	209.2	15.5	1.000011
77500.0	31.6	-54.0	0.	-0.	50.3	576.4	216.4	16.0	1.000011
78000.0	30.9	-53.6	0.	-0.	49.1	576.9	218.9	15.5	1.000011

H3

** AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

UPPER AIR DATA

STATION ALTITUDE 3989.0 FEET MSL
 20 APR. 66 2300 HRS MST
 ASCENSION NO. 262

3911009
 WHITE SANDS SITE
 TABLE VII (Cont)

WSTM SITE COORDINATES
 E 488,580 FEET
 N 185,045 FEET

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE AIR DEGREES CENTIGRADE	RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND KNOTS	WIND DATA		INDEX OF REFRACTION
						DIRECTION DEGREES(TN)	SPEED KNOTS	
78500.0	30.2	-55.3	-0. **	47.8	577.4	209.8	12.9	1.000011
79000.0	29.5	-52.9	-0. **	46.7	577.9	200.7	10.2	1.000010
79500.0	28.8	-52.5	-0. **	45.5	578.4	212.4	10.6	1.000010
80000.0	28.1	-52.1	-0. **	44.4	578.9	226.4	11.3	1.000010
80500.0	27.5	-51.8	-0. **	43.3	579.4	232.9	11.3	1.000010
81000.0	26.9	-51.4	-0. **	42.2	579.8	232.4	10.6	1.000009
81500.0	26.2	-51.0	-0. **	41.1	580.3	232.5	10.4	1.000009
82000.0	25.6	-50.6	-0. **	40.1	580.8	235.6	12.7	1.000009
82500.0	25.0	-50.3	-0. **	39.1	581.3	238.6	15.1	1.000009
83000.0	24.5	-49.9	-0. **	38.2	581.8	239.4	16.3	1.000008
83500.0	23.9	-49.5	-0. **	37.2	582.3	239.4	17.2	1.000008
84000.0	23.4	-49.3	-0. **	36.3	582.6	239.4	18.5	1.000008
84500.0	22.8	-49.0	-0. **	35.5	583.0	239.4	20.9	1.000008
85000.0	22.3	-48.7	-0. **	34.6	583.3	239.4	23.3	1.000008
85500.0	21.8	-48.4	-0. **	33.8	583.7	239.4	23.1	1.000008
86000.0	21.3	-48.2	-0. **	33.0	584.1	239.4	22.7	1.000007
86500.0	20.8	-47.9	-0. **	32.2	584.4	239.4	21.4	1.000007
87000.0	20.4	-47.6	-0. **	31.4	584.8	239.4	19.0	1.000007
87500.0	19.9	-47.3	-0. **	30.7	585.1	239.5	16.7	1.000007
88000.0	19.4	-47.0	-0. **	30.0	585.5	242.3	14.5	1.000007
88500.0	19.0	-46.8	-0. **	29.2	585.9	245.1	12.4	1.000007
89000.0	18.6	-46.5	-0. **	28.5	586.2	256.7	11.3	1.000006
89500.0	18.2	-46.2	-0. **	27.9	586.6	274.6	11.1	1.000006
90000.0	17.7	-46.1	-0. **	27.2	586.7	290.8	11.0	1.000006
90500.0	17.3	-46.0	-0. **	26.6	586.8	302.3	11.2	1.000006
91000.0	17.0	-46.0	-0. **	26.0	586.8	313.9	11.3	1.000006
91500.0	16.6	-46.0	-0. **	25.4	586.9	326.2	11.2	1.000006
92000.0	16.2	-46.0	-0. **	24.8	586.9	338.5	11.0	1.000006
92500.0	15.8	-45.9	-0. **	24.3	587.0	2.4	9.9	1.000005
93000.0	15.5	-45.9	-0. **	23.7	587.0	26.9	8.7	1.000005

** AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

STATION ALTITUDE 3589.0 FEET MSL
20 APR. 66 2300 HRS MST
ASCENSION NO. 262

UPPER AIR DATA
3911009
WHITE SANDS SITE
TABLE VII (Cont)

WSIM SITE COORDINATES
E 488,580 FEET
N 185,045 FEET

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE		RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND		WIND DIRECTION DEGREES(TN)	WIND DATA		INDEX OF REFRACTION
		AIR DEGREES	DEWPOINT CENTIGRADE			KNOTS	KNOTS		SPEED KNOTS		
93500.0	15.1	-45.9	0.	-0.	23.2	587.0	37.1	37.1	7.4	1.000005	
94000.0	14.8	-45.8	0.	-0.	22.7	587.1	44.0	44.0	6.0	1.000005	
94500.0	14.5	-45.8	0.	-0.	22.2	587.1	50.7	50.7	5.0	1.000005	
95000.0	14.1	-45.8	0.	-0.	21.7	587.2	57.3	57.3	4.2	1.000005	
95500.0	13.8	-45.7	0.	-0.	21.2	587.2	106.7	106.7	3.1	1.000005	
96000.0	13.5	-45.7	0.	-0.	20.7	587.2	191.1	191.1	1.7	1.000005	
96500.0	13.2	-45.7	0.	-0.	20.2	587.3	240.3	240.3	0.8	1.000005	
97000.0	12.9	-45.6	0.	-0.	19.8	587.3	240.3	240.3	0.8	1.000004	
97500.0	12.6	-45.6	0.	-0.	19.3	587.4	264.4	264.4	0.7	1.000004	
98000.0	12.3	-45.6	0.	-0.	18.9	587.4	348.8	348.8	0.6	1.000004	
98500.0	12.1	-45.5	0.	-0.	18.5	587.5	51.5	51.5	0.7	1.000004	
99000.0	11.8	-45.5	0.	-0.	18.1	587.5	353.7	353.7	2.0	1.000004	
99500.0	11.5	-45.5	0.	-0.	17.6	587.5	297.3	297.3	3.3	1.000004	
100000.0	11.3	-45.4	0.	-0.	17.2	587.6	307.6	307.6	4.3	1.000004	
100500.0	11.0	-45.4	0.	-0.	16.9	587.6	318.0	318.0	5.3	1.000004	
101000.0	10.8	-41.5	0.	-0.	16.2	592.6	318.2	318.2	7.1	1.000004	
101500.0	10.6	-37.4	0.	-0.	15.6	597.9	316.5	316.5	8.9	1.000003	
102000.0	10.4	-33.2	0.	-0.	15.0	603.2	316.7	316.7	10.1	1.000003	
102500.0	10.1	-29.0	0.	-0.	14.5	608.4	318.7	318.7	10.6	1.000003	
103000.0	9.9	-24.8	0.	-0.	13.9	613.6	320.4	320.4	10.9	1.000003	
103500.0	9.7	-20.6	0.	-0.	13.4	618.8	320.9	320.9	10.3	1.000003	
104000.0	9.5	-16.4	0.	-0.	12.9	623.9	321.5	321.5	9.7	1.000003	
104500.0	9.3	-12.3	0.	-0.	12.5	628.9				1.000003	
105000.0	9.2	-8.1	0.	-0.	12.0	634.0				1.000003	
105500.0	9.0	-3.9	0.	-0.	11.6	638.9				1.000003	

** AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

STATION ALTITUDE 3989.0 FEET MSL
21 APR. 66 425 HRS MST
ASCENSION NO. 265

UPPER AIR DATA
3911106
WHITE SANDS SITE
TABLE VIII

WSTM SITE COORDINATES
E 488,580 FEET
N 185,045 FEET

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE		RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND		WIND DATA		INDEX OF REFRACTION
		AIR DEGREES	DEWPOINT CENTIGRADE			SOUND KNOTS	DIRECTION DEGREES(TN)	SPEED KNOTS		
3989.0	878.9	7.3	-9.2	30.0	1090.5	652.5	0.	0.	0.	1.000258
4000.0	878.5	7.4	-8.9	30.3	1089.5	652.7	0.7	0.7	0.0	1.000258
4500.0	862.5	11.0	-2.9	37.6	1055.5	657.0	31.1	31.1	2.2	1.000258
5000.0	846.8	10.4	-3.8	35.7	1038.5	656.3	61.6	61.6	4.3	1.000253
5500.0	831.4	9.8	-4.7	35.9	1021.8	655.6	92.0	92.0	6.4	1.000248
6000.0	816.2	9.2	-5.5	35.0	1005.4	654.9	122.4	122.4	8.6	1.000243
6500.0	801.3	8.6	-6.4	34.1	989.3	654.1	137.2	137.2	9.3	1.000239
7000.0	786.7	8.0	-7.3	33.2	973.4	653.4	142.2	142.2	9.2	1.000234
7500.0	772.4	7.4	-8.2	32.3	957.8	652.7	143.5	143.5	10.5	1.000229
8000.0	758.3	6.8	-9.0	31.4	942.4	652.0	143.9	143.9	12.2	1.000225
8500.0	744.3	6.0	-9.5	31.9	927.6	651.0	148.2	148.2	13.0	1.000221
9000.0	730.5	5.1	-9.7	33.4	913.5	650.0	152.9	152.9	13.7	1.000218
9500.0	717.0	4.1	-10.0	35.0	899.5	648.9	158.3	158.3	14.7	1.000215
10000.0	703.7	3.2	-10.3	36.6	885.8	647.8	163.8	163.8	15.9	1.000211
10500.0	690.6	2.3	-10.6	38.2	872.3	646.7	170.1	170.1	17.3	1.000208
11000.0	677.7	1.2	-10.7	40.8	859.5	645.4	175.8	175.8	19.2	1.000205
11500.0	665.0	-0.2	-10.8	44.7	847.4	643.8	180.3	180.3	21.7	1.000202
12000.0	652.4	-1.5	-11.0	48.5	835.4	642.3	184.0	184.0	23.8	1.000200
12500.0	640.1	-2.8	-11.3	51.9	823.6	640.8	187.2	187.2	25.5	1.000197
13000.0	627.9	-3.7	-12.7	49.9	810.8	639.6	191.5	191.5	26.7	1.000193
13500.0	616.0	-4.6	-14.0	48.0	798.1	638.5	195.9	195.9	27.8	1.000189
14000.0	604.1	-5.9	-13.8	54.1	786.6	636.9	200.7	200.7	28.6	1.000186
14500.0	592.5	-7.2	-13.9	59.4	775.3	635.4	205.4	205.4	29.4	1.000184
15000.0	581.0	-8.4	-17.9	46.5	763.8	633.9	210.0	210.0	30.5	1.000178
15500.0	569.7	-9.5	-22.7	33.6	752.4	632.4	213.0	213.0	31.9	1.000173
16000.0	558.5	-10.7	-25.9	27.6	741.2	630.9	214.7	214.7	33.5	1.000169
16500.0	547.5	-12.0	-26.6	28.7	730.2	629.4	215.4	215.4	34.8	1.000167
17000.0	536.8	-13.3	-27.3	29.9	719.4	627.8	215.6	215.6	35.9	1.000164
17500.0	526.2	-14.6	-27.9	31.5	708.7	626.2	216.0	216.0	37.1	1.000161
18000.0	515.6	-15.9	-27.1	27.6	698.0	624.7	216.3	216.3	38.3	1.000159

STATION ALTITUDE 3989.0 FEET MSL
21 APR. 66 425 HRS MST
ASCENSION NO. 265

UPPER AIR DATA
3911106
WHITE SANDS SITE
TABLE VIII (Cont)

WSIM SITE COORDINATES
E 488,580 FEET
N 185,045 FEET

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE		RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND KNOTS	WIND DATA		INDEX OF REFRACTION
		AIR DEGREES	DEWPOINT CENTIGRADE				DIRECTION DEGREES(TN)	SPEED KNOTS	
18500.0	505.3	-17.2	-26.7	43.8	687.4	623.1	217.7	39.0	1.000157
19000.0	495.1	-18.5	-26.4	50.0	676.9	621.6	219.1	39.8	1.000155
19500.0	485.2	-19.7	-26.1	57.8	666.7	620.0	220.9	39.8	1.000153
20000.0	475.3	-21.0	-24.7	72.9	656.4	618.4	222.6	39.7	1.000151
20500.0	465.6	-22.4	-23.9	88.0	646.3	616.9	223.3	38.8	1.000149
21000.0	456.0	-23.6	-23.8	100.0	636.3	615.3	224.1	37.9	1.000147
21500.0	446.5	-24.7	-24.9	100.0	625.9	613.9	225.3	36.7	1.000144
22000.0	437.2	-25.9	-26.0	100.0	615.6	612.5	226.4	36.0	1.000142
22500.0	428.1	-27.0	-27.2	100.0	605.6	611.1	227.3	36.4	1.000139
23000.0	419.2	-28.1	-28.3	100.0	595.7	609.7	227.5	37.1	1.000136
23500.0	410.4	-29.2	-29.4	100.0	586.0	608.3	226.8	38.6	1.000134
24000.0	401.9	-30.4	-30.5	100.0	576.4	606.9	225.7	41.0	1.000131
24500.0	393.3	-31.5	-31.7	99.9	566.7	605.5	224.1	44.7	1.000129
25000.0	384.9	-32.6	-32.8	99.7	557.2	604.1	222.9	47.3	1.000127
25500.0	376.6	-33.7	-33.9	99.5	547.8	602.7	222.6	47.1	1.000124
26000.0	368.5	-34.8	-35.1	99.3	538.5	601.2	222.3	46.9	1.000122
26500.0	360.6	-35.9	-36.2	99.2	529.5	599.8	222.6	46.4	1.000120
27000.0	352.9	-37.0	-37.3	99.0	520.6	598.4	223.9	45.4	1.000118
27500.0	345.1	-38.3	-38.9	96.3	511.9	596.7	225.3	44.3	1.000115
28000.0	337.4	-39.7	-40.5	93.7	503.4	595.0	227.3	42.1	1.000113
28500.0	329.9	-41.0	-42.1	91.0	495.0	593.3	229.7	39.3	1.000111
29000.0	322.5	-42.3	-43.7	88.3	486.8	591.6	230.8	38.9	1.000109
29500.0	315.4	-43.7	-45.3	85.7	478.7	589.9	231.2	39.6	1.000107
30000.0	308.4	-45.0	-46.9	83.0	470.8	588.2	231.5	40.6	1.000106
30500.0	301.5	-46.3	-48.5	80.4	463.0	586.5	231.8	41.7	1.000104
31000.0	294.8	-47.6	-50.1	77.7	455.4	584.8	232.4	42.4	1.000102
31500.0	288.0	-48.9	-52.1	70.8**	447.5	583.1	233.3	42.8	1.000100
32000.0	281.3	-50.2	-54.4	62.2**	439.5	581.4	234.4	42.9	1.000098
32500.0	274.7	-51.5	-56.9	53.6**	431.7	579.8	235.6	42.9	1.000096
33000.0	268.3	-52.7	-59.4	45.0**	424.1	578.1	234.4	44.7	1.000095

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** AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

STATION ALTITUDE 3889.0 FEET MSL
21 APR. 66
ASCENSION NO. 265

UPPER AIR DATA
3911106
WHITE SANDS SITE
TABLE VIII (CONT)

WSTM SITE COORDINATES
E 488,580 FEET
N 185,045 FEET

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE		RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND		WIND DATA		INDEX OF REFRACTION
		AIR DEGREES	DEWPOINT CENTIGRADE			KNOTS	KNOTS	DIRECTION DEGREES(TN)	SPEED KNOTS	
33500.0	262.0	-54.0	-62.2	36.4**	416.6	576.4		232.8	46.9	1.000093
34000.0	255.9	-55.3	-65.4	27.9**	409.2	574.7		231.8	47.4	1.000091
34500.0	249.9	-56.5	-69.1	19.3**	402.0	573.1		230.9	47.7	1.000090
35000.0	244.1	-57.8	-74.2	10.7**	394.9	571.4		231.2	46.9	1.000088
35500.0	238.4	-59.1	-85.0	2.1**	388.0	569.7		231.8	46.2	1.000086
36000.0	232.7	-59.8	0.	-0.	379.9	568.8		234.2	46.4	1.000085
36500.0	227.0	-60.3	0.	-0.	371.6	568.1		236.8	46.7	1.000083
37000.0	221.6	-60.7	0.	-0.	363.4	567.5		239.9	47.6	1.000081
37500.0	216.2	-61.2	0.	-0.	355.5	566.8		242.1	48.7	1.000079
38000.0	211.0	-61.7	0.	-0.	347.7	566.2		242.7	50.2	1.000077
38500.0	205.9	-62.2	0.	-0.	340.0	565.5		244.0	49.7	1.000076
39000.0	200.9	-62.7	0.	-0.	332.6	564.9		245.8	47.7	1.000074
39500.0	196.0	-63.2	0.	-0.	325.3	564.2		247.5	45.9	1.000072
40000.0	191.3	-62.9	0.	-0.	317.0	564.6		249.3	44.1	1.000071
40500.0	186.7	-62.1	0.	-0.	308.2	565.7		251.4	43.7	1.000069
41000.0	182.2	-61.3	0.	-0.	299.6	566.8		253.5	43.7	1.000067
41500.0	177.8	-60.4	0.	-0.	291.2	567.9		252.7	45.3	1.000065
42000.0	173.5	-59.6	0.	-0.	283.0	569.0		251.5	47.1	1.000063
42500.0	169.3	-58.8	0.	-0.	275.1	570.1		248.9	47.8	1.000061
43000.0	165.3	-58.5	0.	-0.	268.2	570.5		246.4	48.5	1.000060
43500.0	161.3	-58.2	0.	-0.	261.5	570.9		245.7	48.7	1.000058
44000.0	157.5	-58.0	0.	-0.	255.0	571.2		245.4	48.7	1.000057
44500.0	153.7	-57.7	0.	-0.	248.6	571.5		248.2	47.1	1.000055
45000.0	150.1	-57.9	0.	-0.	242.9	571.3		251.1	45.7	1.000054
45500.0	146.5	-58.4	0.	-0.	237.7	570.6		254.7	45.4	1.000053
46000.0	143.0	-58.4	0.	-0.	232.1	570.6		257.7	44.5	1.000052
46500.0	139.6	-58.3	0.	-0.	226.4	570.8		260.0	42.8	1.000050
47000.0	136.3	-58.2	0.	-0.	220.9	570.9		259.2	41.3	1.000049
47500.0	133.1	-58.0	0.	-0.	215.5	571.1		256.6	39.9	1.000048
48000.0	129.9	-57.9	0.	-0.	210.3	571.2		254.1	38.7	1.000047

** AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

STATION ALTITUDE 3989.0 FEET MSL
 21 APR. 66
 ASCENSION NO. 265

UPPER AIR DATA
 3911106
 WHITE SANDS SITE
 TABLE VIII (Cont)

WSTM SITE COORDINATES
 E 488,580 FEET
 N 185,045 FEET

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE		RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND		WIND DATA		INDEX OF REFRACTION
		AIR DEGREES	DEWPOINT CENTIGRADE			KNOTS	KNOTS	DIRECTION DEGREES(TN)	SPEED KNOTS	
48500.0	126.8	-57.8	0.	-0.	205.2	571.4	571.4	251.7	37.5	1.000046
49000.0	123.8	-57.7	0.	-0.	200.2	571.6	571.6	247.8	37.1	1.000045
49500.0	120.9	-57.6	0.	-0.	195.3	571.7	571.7	244.1	36.7	1.000043
50000.0	118.0	-57.5	0.	-0.	190.6	571.9	571.9	243.3	35.7	1.000042
50500.0	115.2	-57.3	0.	-0.	186.0	572.0	572.0	242.4	34.8	1.000041
51000.0	112.5	-57.2	0.	-0.	181.4	572.2	572.2	241.1	35.0	1.000040
51500.0	109.8	-57.2	0.	-0.	177.1	572.2	572.2	239.7	35.2	1.000039
52000.0	107.2	-57.2	0.	-0.	172.9	572.2	572.2	238.3	35.3	1.000039
52500.0	104.6	-57.2	0.	-0.	168.8	572.2	572.2	236.9	35.5	1.000038
53000.0	102.2	-57.2	0.	-0.	164.8	572.2	572.2	237.0	35.5	1.000037
53500.0	99.7	-57.2	0.	-0.	161.0	572.2	572.2	237.2	35.4	1.000036
54000.0	97.4	-57.6	0.	-0.	157.4	571.7	571.7	238.7	35.6	1.000035
54500.0	95.0	-58.0	0.	-0.	153.9	571.2	571.2	240.4	35.9	1.000034
55000.0	92.8	-58.3	0.	-0.	150.5	570.7	570.7	243.4	36.5	1.000033
55500.0	90.5	-58.7	0.	-0.	147.1	570.2	570.2	246.6	37.1	1.000033
56000.0	88.4	-59.1	0.	-0.	143.9	569.7	569.7	247.6	37.3	1.000032
56500.0	86.3	-59.5	0.	-0.	140.7	569.2	569.2	247.8	37.3	1.000031
57000.0	84.2	-59.8	0.	-0.	137.5	568.7	568.7	248.3	37.0	1.000031
57500.0	82.2	-60.2	0.	-0.	134.5	568.2	568.2	248.9	36.6	1.000030
58000.0	80.2	-60.6	0.	-0.	131.5	567.7	567.7	247.9	35.9	1.000029
58500.0	78.3	-60.9	0.	-0.	128.6	567.2	567.2	246.8	35.2	1.000029
59000.0	76.4	-61.3	0.	-0.	125.7	566.7	566.7	245.2	34.8	1.000028
59500.0	74.6	-61.0	0.	-0.	122.5	567.1	567.1	243.7	34.5	1.000027
60000.0	72.8	-60.5	0.	-0.	119.3	567.8	567.8	242.9	34.4	1.000027
60500.0	71.1	-60.0	0.	-0.	116.2	568.5	568.5	242.2	34.3	1.000026
61000.0	69.4	-59.4	0.	-0.	113.1	569.2	569.2	244.0	34.5	1.000025
61500.0	67.7	-58.9	0.	-0.	110.1	569.9	569.9	246.1	34.8	1.000025
62000.0	66.1	-58.4	0.	-0.	107.2	570.6	570.6	250.3	35.7	1.000024
62500.0	64.5	-57.9	0.	-0.	104.4	571.3	571.3	255.0	36.7	1.000023
63000.0	63.0	-58.1	0.	-0.	102.0	571.0	571.0	255.1	36.8	1.000023

STATION ALTITUDE 3587.0 FEET MSL
21 APR. 66 425 HRS PST
ASCENSION NO. 265

UPPER AIR DATA
3911106
WHITE SANDS SITE
TABLE VIII (Cont)

WSIM SITE COORDINATES
E 488,580 FEET
N 185,045 FEET

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE		RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND		WIND DATA		INDEX OF REFRACTION
		AIR DEGREES	DEWPOINT CENTIGRADE			KNOTS	KNOTS	DIRECTION DEGREES(TN)	SPEED KNOTS	
63500.0	61.5	-58.7	0.	-0. **	99.9	570.2		254.5	36.7	1.000022
64000.0	60.0	-59.3	0.	-0. **	97.8	569.4		251.6	36.2	1.000022
64500.0	58.6	-59.9	0.	-0. **	95.7	568.5		248.2	35.6	1.000021
65000.0	57.2	-60.6	0.	-0. **	93.7	567.7		246.2	35.3	1.000021
65500.0	55.8	-61.2	0.	-0. **	91.7	566.9		244.6	35.1	1.000020
66000.0	54.5	-61.8	0.	-0. **	89.8	566.1		243.5	35.0	1.000020
66500.0	53.2	-61.3	0.	-0. **	87.4	566.8		242.7	34.9	1.000019
67000.0	51.9	-60.2	0.	-0. **	84.9	568.2		243.7	35.5	1.000019
67500.0	50.7	-59.1	0.	-0. **	82.5	569.6		245.6	36.2	1.000018
68000.0	49.5	-58.1	0.	-0. **	80.1	571.1		245.2	36.9	1.000018
68500.0	48.3	-57.0	0.	-0. **	77.8	572.5		243.4	37.6	1.000017
69000.0	47.1	-55.9	0.	-0. **	75.6	573.9		242.0	38.1	1.000017
69500.0	46.0	-54.8	0.	-0. **	73.4	575.4		241.1	38.5	1.000016
70000.0	44.9	-53.8	0.	-0. **	71.4	576.7		240.2	39.1	1.000016
70500.0	43.9	-54.0	0.	-0. **	69.8	576.5		238.5	42.2	1.000016
71000.0	42.5	-54.1	0.	-0. **	68.2	576.2		236.8	45.2	1.000015
71500.0	41.9	-54.3	0.	-0. **	66.6	576.0		235.8	41.8	1.000015
72000.0	40.9	-54.5	0.	-0. **	65.1	575.8		235.2	35.7	1.000014
72500.0	39.9	-54.7	0.	-0. **	63.7	575.6		235.7	31.0	1.000014
73000.0	39.0	-54.8	0.	-0. **	62.2	575.3		239.3	29.6	1.000014
73500.0	38.1	-55.0	0.	-0. **	60.8	575.1		242.8	28.2	1.000014
74000.0	37.2	-55.2	0.	-0. **	59.4	574.9		251.4	23.8	1.000013
74500.0	36.3	-54.7	0.	-0. **	57.9	575.5		260.9	18.9	1.000013
75000.0	35.5	-54.0	0.	-0. **	56.4	576.4		266.0	17.8	1.000013
75500.0	34.7	-53.4	0.	-0. **	55.0	577.2		265.4	21.6	1.000012
76000.0	33.9	-52.8	0.	-0. **	53.5	578.1		264.7	25.5	1.000012
76500.0	33.1	-52.1	0.	-0. **	52.1	578.9		263.8	24.0	1.000012
77000.0	32.3	-51.5	0.	-0. **	50.8	579.8		262.8	22.5	1.000011
77500.0	31.6	-51.2	0.	-0. **	49.5	580.1		261.2	21.3	1.000011
78000.0	30.8	-51.2	0.	-0. **	48.4	580.1		259.1	20.3	1.000011

** AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

STATION ALTITUDE 3989.0 FEET MSL
 21 APR. 66
 ASCENSION NO. 265

UPPER AIR DATA
 3911106
 WHITE SANDS SITE
 TABLE VIII (Cont)

WSTM SITE COORDINATES
 E 488,580 FEET
 N 185,045 FEET

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	AIR TEMPERATURE DEGREES	DEWPOINT CENTIGRADE	RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND KNOTS	WIND DATA DIRECTION DEGREES(TN)	SPEED KNOTS	INDEX OF REFRACTION
78500.0	30.1	-51.2	0.	-0.	47.3	580.1	257.0	19.3	1.000011
79000.0	29.4	-51.2	0.	-0.	46.2	580.1	255.7	19.0	1.000010
79500.0	28.8	-51.2	0.	-0.	45.1	580.1	254.4	18.6	1.000010
80000.0	28.1	-51.2	0.	-0.	44.1	580.1	253.0	18.3	1.000010
80500.0	27.4	-51.2	0.	-0.	43.1	580.1	251.5	18.0	1.000010
81000.0	26.8	-51.2	0.	-0.	42.1	580.1	250.1	17.6	1.000009
81500.0	26.2	-51.2	0.	-0.	41.1	580.1	250.6	17.1	1.000009
82000.0	25.6	-51.2	0.	-0.	40.2	580.1	251.1	16.6	1.000009
82500.0	25.0	-51.2	0.	-0.	39.3	580.1	250.4	14.6	1.000009
83000.0	24.4	-51.2	0.	-0.	38.4	580.1	248.7	11.2	1.000009
83500.0	23.9	-51.2	0.	-0.	37.5	580.1	246.9	7.8	1.000008
84000.0	23.3	-51.2	0.	-0.	36.6	580.1	253.0	7.3	1.000008
84500.0	22.8	-51.1	0.	-0.	35.8	580.3	259.1	6.9	1.000008
85000.0	22.3	-50.8	0.	-0.	34.9	580.7	277.5	6.8	1.000008
85500.0	21.8	-50.5	0.	-0.	34.0	581.1	311.0	7.3	1.000008
86000.0	21.3	-50.1	0.	-0.	33.2	581.5	344.6	7.8	1.000007
86500.0	20.8	-49.8	0.	-0.	32.4	581.9	336.7	9.8	1.000007
87000.0	20.3	-49.5	0.	-0.	31.6	582.3	323.6	12.0	1.000007
87500.0	19.8	-49.2	0.	-0.	30.9	582.7	317.7	13.5	1.000007
88000.0	19.4	-48.9	0.	-0.	30.1	583.1	326.9	13.5	1.000007
88500.0	19.0	-48.6	0.	-0.	29.4	583.5	336.1	13.5	1.000007
89000.0	18.5	-48.3	0.	-0.	28.7	583.9	328.5	12.3	1.000006
89500.0	18.1	-48.0	0.	-0.	28.0	584.3	315.5	10.7	1.000006
90000.0	17.7	-47.6	0.	-0.	27.3	584.7	309.1	9.3	1.000006
90500.0	17.3	-47.3	0.	-0.	26.7	585.1	329.8	8.2	1.000006
91000.0	16.9	-47.0	0.	-0.	26.0	585.5	350.4	7.2	1.000006
91500.0	16.5	-46.7	0.	-0.	25.4	585.9	348.1	6.3	1.000006
92000.0	16.1	-46.4	0.	-0.	24.8	586.3	332.2	5.3	1.000006
92500.0	15.8	-46.1	0.	-0.	24.2	586.7	316.7	4.5	1.000005
93000.0	15.4	-45.9	0.	-0.	23.6	587.0	310.7	4.6	1.000005

STATION ALTITUDE 3989.0 FEET MSL
21 APR. 66
ASCENSION NO. 265

UPPER AIR DATA
3911106
WHITE SANDS SITE
TABLE VIII (CONT)

WSTM SITE COORDINATES
E 488,580 FEET
N 185,045 FEET

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE		RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND		WIND DATA		INDEX OF REFRACTION
		AIR DEGREES	DEWPOINT CENTIGRADE			KNOTS	KNOTS	DIRECTION DEGREES(TN)	SPEED KNOTS	
93500.0	15.1	-45.6	0.	**	23.1	587.4		304.6	4.8	1.000005
94000.0	14.7	-45.3	0.	**	22.5	587.8		304.0	4.8	1.000005
94500.0	14.4	-45.0	0.	**	22.0	588.1		310.9	4.7	1.000005
95000.0	14.1	-44.7	0.	**	21.5	588.5		317.7	4.5	1.000005
95500.0	13.8	-44.4	0.	**	21.0	588.9		316.5	5.0	1.000005
96000.0	13.5	-44.1	0.	**	20.5	589.2		313.5	5.6	1.000005
96500.0	13.2	-43.9	0.	**	20.0	589.6		310.1	6.1	1.000004
97000.0	12.9	-43.7	0.	**	19.6	589.8		304.5	5.8	1.000004
97500.0	12.6	-43.7	0.	**	19.1	589.8		298.9	5.4	1.000004
98000.0	12.3	-43.7	0.	**	18.7	589.8		305.5	5.0	1.000004
98500.0	12.0	-43.8	0.	**	18.3	589.7		337.1	4.3	1.000004
99000.0	11.8	-43.8	0.	**	17.9	589.7		8.7	3.6	1.000004
99500.0	11.5	-43.8	0.	**	17.5	589.7		13.9	2.8	1.000004
100000.0	11.3	-43.8	0.	**	17.1	589.7		323.3	1.8	1.000004
100500.0	11.0	-43.8	0.	**	16.7	589.7		272.6	0.7	1.000004
101000.0	10.8	-43.8	0.	**	16.3	589.6		256.8	0.1	1.000004
101500.0	10.5	-43.9	0.	**	16.0	589.6		316.5	0.2	1.000004
102000.0	10.3	-43.9	0.	**	15.6	589.6		16.2	0.4	1.000003
102500.0	10.1	-43.9	0.	**	15.3	589.6		39.8	1.2	1.000003
103000.0	9.8	-43.7	0.	**	14.9	589.8		340.5	3.6	1.000003
103500.0	9.6	-43.4	0.	**	14.6	590.2		281.2	6.1	1.000003
104000.0	9.4	-43.1	0.	**	14.2	590.6		249.9	7.7	1.000003
104500.0	9.2	-42.8	0.	**	13.9	591.0		295.2	7.3	1.000003
105000.0	9.0	-42.5	0.	**	13.6	591.4		340.5	6.9	1.000003
105500.0	8.8	-42.2	0.	**	13.3	591.8		14.6	6.8	1.000003
106000.0	8.6	-41.9	0.	**	13.0	592.1		8.1	7.9	1.000003
106500.0	8.4	-41.6	0.	**	12.7	592.5		1.6	9.1	1.000003
107000.0	8.2	-41.3	0.	**	12.4	592.9		354.3	9.9	1.000003
107500.0	8.1	-41.0	0.	**	12.1	593.3		343.1	9.6	1.000003
108000.0	7.9	-40.7	0.	**	11.8	593.7		331.9	9.2	1.000003

** AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

STATION ALTITUDE 3989.0 FEET MSL
21 APR. 66 425 HRS MST
ASCENSION NO. 265

UPPER AIR DATA
3911106
WHITE SANDS SITE
TABLE VIII (Cont)

WSTM SITE COORDINATES
E 488,580 FEET
N 185,045 FEET

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE AIR DEGREES	TEMPERATURE DEWPOINT CENTIGRADE	RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND KNOTS	WIND DATA DIRECTION DEGREES(TN)	SPEED KNOTS	INDEX OF REFRACTION
108500.0	7.7	-40.4	0.	-0. **	11.5	594.0	319.7	9.1	1.000003
109000.0	7.5	-40.1	0.	-0. **	11.3	594.4	300.0	11.0	1.000003
109500.0	7.4	-39.8	0.	-0. **	11.0	594.8	280.3	13.0	1.000002
110000.0	7.2	-39.5	0.	-0. **	10.8	595.2	261.5	14.9	1.000002
110500.0	7.1	-39.2	0.	-0. **	10.5	595.6	256.5	17.2	1.000002
111000.0	6.9	-38.9	0.	-0. **	10.3	595.9	251.4	19.4	1.000002
111500.0	6.8	-38.6	0.	-0. **	10.0	596.3			1.000002
112000.0	6.6	-38.3	0.	-0. **	9.8	596.7			1.000002
112500.0	6.5	-38.0	0.	-0. **	9.6	597.1			1.000002
113000.0	6.3	-37.7	0.	-0. **	9.4	597.4			1.000002
113500.0	6.2	-37.4	0.	-0. **	9.1	597.8			1.000002
114000.0	6.0	-37.1	0.	-0. **	8.9	598.2			1.000002
114500.0	5.9	-36.8	0.	-0. **	8.7	598.6			1.000002

** AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

RELEASE TIME (MST)		IMPACT DISPLACEMENT IN MILES DUE TO WIND								THEORETICAL IMPACT IN MILES FROM LAUNCHER					
		143- 4000 FT				4000- 20000 FT						20000- 100000 FT		TOTAL	
		N-S	E-W	N-S	E-W	N-S	E-W	N-S	E-W			N-S	E-W		
RAWINSONDE		PIBAL	N-S	E-W	N-S	E-W	N-S	E-W	N-S	E-W	N-S	E-W			
R ₁ 2300	R 2300	P 0045	8.9S	8.7E	13.1S	10.3W	7.5S	11.4W	29.5S	13.0W	60.6N	21.9W			
R ₁ 2300	R 2300	P 0116	5.2S	7.0E	13.1S	10.3W	7.5S	11.4W	25.8S	14.7W	64.3N	23.6W			
R ₁ 2300	R 2300	P 0140	5.5S	9.1E	13.1S	10.3W	7.5S	11.4W	26.1S	12.6W	64.0N	21.5W			
R ₂ 0110	R 2300	P 0215	10.1S	12.1E	17.4S	9.1W	7.5S	11.4W	35.0S	8.4W	55.1N	17.3W			
R ₂ 0110	R 2300	P 0230	14.1S	19.8E	17.4S	9.1W	7.5S	11.4W	39.0S	0.7W	51.1N	9.6W			
R ₂ 0110	R 2300	P 0250	10.0S	25.0E	17.4S	9.1W	7.5S	11.4W	34.9S	4.5E	55.2N	4.4W			
R ₂ 0110	R ₃ 0110	P 0325	13.2S	29.9E	17.4S	9.1W	7.0S	12.8W	37.6S	8.0E	52.5N	0.9W			
R ₂ 0110	R ₃ 0110	P 0340	15.8S	25.4E	17.4S	9.1W	7.0S	12.8W	40.2S	3.5E	49.9N	5.4W			
R ₂ 0110	R ₃ 0110	P 0353	11.6S	24.5E	17.4S	9.1W	7.0S	12.8W	36.0S	2.6E	54.1N	6.3W			
R ₂ 0335	R ₃ 0110	P 0403	13.9S	24.2E	18.7S	6.0W	7.0S	12.8W	39.6S	5.4E	50.5N	3.5W			
R ₂ 0335	R ₃ 0110	P 0411	7.9S	18.5E	18.7S	6.0W	7.0S	12.8W	33.6S	0.3W	56.5N	9.2W			
R ₂ 0335	R ₃ 0110	P 0417	9.7S	16.5E	18.7S	6.0W	7.0S	12.8W	35.4S	2.3W	54.7N	11.2W			
*R ₁ 0425	*R 0425	*P 0426	18.9S	19.5E	19.9S	7.6W	8.7S	13.3W	47.5S	1.4W	42.6N	10.3W			

TIME: 0425 MST
DATE: 21 April 1966

TABLE IX. IMPACT PREDICTION DATA
AERObEE NASA 4.165 UA

* = Post-Shoot Data
P = Double Theodolite Winds (143-4,000 FT)
R = Rawinsonde Winds (Above 20,000 FT)
R₁ = Rawinsonde Winds (4,000-20,000 FT)
R₂ = Rawin Winds (4,000-20,000 FT)
R₃ = Rawin Winds (Above 20,000 FT)

JACK SETTINGS FOR LAUNCHER B	West leg	34	inches
	East leg	34	inches
LAUNCHER SETTING	Tilt	5.47	degrees
	Azimuth	357.0	degrees
TILT COMPONENTS	North	5.46	degrees
	West	0.28	degrees
NO WIND IMPACT FROM LAUNCHER	North	90.1	miles
	West	8.9	miles
PREDICTED IMPACT FROM LAUNCHER			
PREDICTED BOOSTER IMPACT FROM LAUNCHER			
RECOMMENDATION - Fire with 98% confidence of impacting on range, based upon: wind correction of 35 miles 1-hr wind variability of 10.5 miles 21 April 1966/0420 MST			
PREDICTED IMPACT FROM LAUNCHER		North	55.0 miles
		West	10.0 miles
		Azimuth	360 degrees
		Distance	2,240 feet

TABLE XI. ACTUAL AND PREDICTED LAUNCH DATA
AEROBEE NASA 4.165 UA

RADAR IMPACT FROM LAUNCHER	North	52.8	miles
	West	10.2	miles
ACTUAL BOOSTER IMPACT FROM LAUNCHER	Azimuth	N/A	degrees
	Distance	N/A	feet

TABLE XII. IMPACT DATA
AEROBEE NASA 4.165 UA

UNCLASSIFIED

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(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)

1. ORIGINATING ACTIVITY (Corporate author) U. S. Army Electronics Command Fort Monmouth, New Jersey		2a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED	
		2b. GROUP	
3. REPORT TITLE METEOROLOGICAL DATA REPORT, AEROBEE NASA 4.165 UA			
4. DESCRIPTIVE NOTES (Type of report and inclusive dates)			
5. AUTHOR(S) (Last name, first name, initial) Hoidale, Marjorie M.			
6. REPORT DATE May 1966		7a. TOTAL NO. OF PAGES 25	7b. NO. OF REFS 2
8a. CONTRACT OR GRANT NO.		9a. ORIGINATOR'S REPORT NUMBER(S) DR-12	
b. PROJECT NO.			
c. DA Task IV650212A127-02		9b. OTHER REPORT NO(S) (Any other numbers that may be assigned this report)	
d.			
10. AVAILABILITY/LIMITATION NOTICES Qualified requesters may obtain copies of this report from DDC.			
11. SUPPLEMENTARY NOTES		12. SPONSORING MILITARY ACTIVITY U. S. Army Electronics Command Atmospheric Sciences Laboratory White Sands Missile Range, New Mexico	
13. ABSTRACT Meteorological data gathered for the launching of Aerobee NASA 4.165 UA are presented for the National Aeronautics and Space Administration, the Johns Hopkins University and for ballistic studies. The data appear, along with calculated ballistic data, in tabular form.			

14. KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
1. Ballistics 2. Meteorology 3. Wind						

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